

REMARKS

Specification

The disclosure was objected to because paragraph 0001 did not include the current status of Application Serial No. 09/748,547. The specification has been amended to address this objection.

Obviousness Type Double Patenting

Claims 1-24 of the present application are rejected for obviousness-type double patenting over claims 1-54 of U.S. Patent 6,640,773 (“773 Patent”). This double patenting rejection is respectfully traversed, as the difference between the claims of the present application and the recited claims of the 773 patent are “more than an obvious variation.”

Initially, it is noted that the examiner has taken the position that the claims in the 773 Patent require injecting two different fuels at different stages when the piston is at or near top dead center (“TDC”). This interpretation of the 773 Patent is incorrect. For example, claim 34 of the 773 Patent recites a method of introducing a single gaseous fuel. Moreover, the two disclosures are directed at different inventions. The 773 Patent is directed *inter alia* at an engine that provides for a first gaseous fuel and a second gaseous fuel introduced at two different times, wherein the first gaseous fuel is allowed to mix with the intake charge resulting in a homogeneous mixture. A second gaseous fuel is then available, if needed, to supplement combustion energy. The second gaseous fuel is injected into the combustion chamber such that it would, in general, burn in a diffusion or stratified combustion mode. By contrast, claims 1-24 of the subject application are directed *inter alia* at a pilot fuel ignited, gaseous-fueled engine that discloses a method of avoiding an excessive knock “window” or range.

Section 804 of the MPEP explains the analysis used for obviousness-type double patenting rejections:

- (1) Determine the scope and content of a patent claim and the prior art relative to a claim in the application at issue; . . .

Any obviousness-type double patenting rejection should make clear:

- (1) The differences between the inventions defined by the conflicting claims -- a claim in the patent compared to a claim in the application; and

(2) The reasons why a person of ordinary skill in the art would conclude that the invention defined in the claim in issue is an obvious variation of the invention defined in a claim in the patent.

Applying this frame work to the present matter, claims 1-19 of the present application recite a method comprising, *inter alia*, “at a pilot fuel timing, introducing a pilot fuel quantity of said pilot fuel at said pilot fuel timing into said cylinder so that it ignites when said piston is at or near top dead centre of the compression stroke, **said pilot timing avoiding a excessive knocking range during a compression stroke of said engine.**” Similarly, claims 20-24 of the present application are directed *inter alia* at a pilot fuel ignited, gaseous-fueled engine comprising “a pilot fuel injection valve controlled by said electronic control unit to introduce said pilot fuel into said cylinder at times and in quantities determined by said electronic control unit with said predetermined operating modes and said set of load conditions . . . **said controller and said pilot fuel injection valve capable of detecting and avoid an excessive knocking range for introduction of said pilot fuel.**” The excessive knocking range disclosed and claimed in the subject application is not obvious over the 773 Patent. In particular, the excessive knocking window (or range as referred to in the subject application) was not predicted in the 773 Patent or the prior art. Generally, it was thought that increased quantities of fuel in combination with increasingly early timing for introducing that fuel would result in excessive knocking in a compression ignition engine, as this was generally the case for other conventional compression ignition engines. With a pilot fuel ignited, gaseous-fuelled engine, the range for injection of the pilot fuel to create an auto ignitable mixture once the piston is at top dead center should avoid the window or range disclosed. In other words early pilot fuel timing passed through a range that was not favorable for knocking and then moved into an early pilot fuel timing range that was favorable (for example, earlier than 50 degrees bTDC - see claim 2). To be more specific and in reference to claim 2, something happens in the engine during mixing of the pilot fuel and the gaseous fuel that results in excessive knocking where the pilot fuel is injected between approximately 50 degrees bTDC and 30 degrees bTDC. This is not obvious, nor was it disclosed in any previous publication, including the 773 Patent. As such, there is no basis for the position

that the claims in the subject application are not allowable on the grounds of obviousness-type, double patenting.

The Examiner is invited to telephone the applicants' undersigned attorney at (312) 775-8263 if any unresolved matters remain with respect to this application.

The Commissioner is hereby authorized to charge any fees due in connection with this submission and credit any overpayment to Deposit Account No. 13-0017.

Respectfully submitted,



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